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An Optical Parametric Oscillator for Organic Photonic Materials

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This report is to certify that we have acquired a Spectra Physics femtosecond Optical Parametric Oscillator OPAL - 1.5 that delivers pulses at a wavelength that is tunable from 1.35 to 1.6 μm , for the amount of \$65,000. The OPAL was installed in November of 2001 and has been running properly since then. This acquisition provided us with the femtosecond laser source needed to conduct research on organic photonic materials for telecommunications and displays.

The laser system is used to establish the foundations for an understanding of charge injection, charge transport, charge trapping, and light-emission in organic molecules and polymers and their applications in storage, displays, and imaging. We are currently developing photorefractive polymers with non-destructive read-out. In these materials, photoconduction is initiated by exciting the organic composites via two-photon states. Photon-gated photorefractive polymers with non-destructive read-out properties are used for image filtering using holographic time gating techniques. The laser system will also be used to investigate the optical gain properties in light-emitting organic molecule and polymers in order to advance the development of organic lasers. The study and characterization of the electronic levels participating in the light-emission process will be conducted through femtosecond pump-probe experiments combined with ultrafast photoconductivity experiments.

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